OLIVER DIPPEL

Developer & AI Researcher

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PROFILE

Ph.D. researcher developing reinforcement learning agents that leverage foundation-model priors to enable online policy adaptation and uncertainty-aware decision making. My work combines Bayesian reinforcement learning, in-context adaptation, and generative model priors to create agents that generalise across tasks without retraining. I am particularly interested in scalable RL systems where prior knowledge, multimodal representations, and model-based reasoning accelerate learning and improve reliability in real-world control settings.

EXPERIENCE

Doctoral Researcher

University of Liverpool

Dec 2021 – Present | Liverpool, United Kingdom

- Develop reinforcement learning agents that leverage foundation-model priors to enable online policy adaptation, uncertainty-aware planning, and rapid generalisation across process conditions without retraining.
- Design and study hierarchical transformer-based priors, in-context RL, and posterior-regularised policies that integrate prior knowledge into decision-making and accelerate learning.
- Build simulators and real-world inspired control benchmarks capturing actuator limits, stochastic disturbances, and safety constraints to evaluate adaptive RL systems under distribution shift.
- Maintain reproducible research pipelines (PyTorch/Stable-Baselines3), including experiment tracking, unit tests, ablation frameworks, and CI infrastructure for scalable experimentation.

Researcher — Autonomous Driving AI

ZeroAI

Sep 2023 – Dec 2024 | Liverpool, United Kingdom

- Built a next-generation autonomous driving stack emphasizing safety, reliability, and deployment robustness.
- Leveraged LLMs for route reasoning, affordance explanation, and policy summarisation; applied diffusion models for trajectory prediction and scene synthesis under uncertainty.
- Developed perception/planning/control modules with multimodal fusion (language–vision–motion priors) to improve interpretability and OOD robustness.
- Designed evaluation protocols (closed-loop sim + log-replay) and safety monitors (rule-based + statistical guards) targeting human-plus performance.
- Contributed to documentation, experiment dashboards, and ablation studies across datasets and weather/lighting conditions.

Freelance Statistics Tutor

statistiknachhilfe.ch

Jan 2021 – Present | Zurich, Switzerland

- Supervised theses, emphasising sound experimental design, inference, and reproducibility.

SKILLS

Reinforcement Learning
Foundation-Model Priors
In-Context Adaptation
Uncertainty-Aware Control
Model-based RL
Generative Modeling
Probabilistic ML
Distributed Training
MLOps
Model Deployment
PyTorch
JAX
Ray/RLlib
W&B
CUDA
Linux
Docker
Git/CI

SELECTED PROJECTS

Foundation-Model Priors for Adaptive Process Control

Ph.D. Research Project

2021 – Present

- Developed reinforcement learning agents that incorporate hierarchical transformer-based priors, enabling online policy adaptation and uncertainty-aware decision-making in continuous industrial control tasks.
- Designed posterior-regularised policy architectures that fuse prior knowledge with real-time observations, achieving robust control under actuator saturation, stochastic disturbances, and shifting operating conditions.
- Established a comprehensive experimental framework with ablations, uncertainty evaluation, and benchmark environments tailored to real-world constraints, fully integrated with reproducible training pipelines and visual analytics.

Generative Forecasting for Trajectories

ZeroAI

2023 – 2024

- Diffusion-based multi-modal trajectory prediction with uncertainty calibration; integrated with rule-based safety envelopes.

Survival Data Back-Engineering Suite

Novartis

2020

- Provide individual and group tutoring sessions to Bachelor's and Master's students in statistics, econometrics, and data science.
- Guide students through advanced statistical concepts, modeling techniques, and software tools such as R and Python.

Data Science Intern

Novartis Pharma AG

Jun 2020 – Dec 2020 | Basel, Switzerland

- **Department:** Early Development Biostatistics
- Developed an algorithm to reconstruct individual patient time-to-event data from published Kaplan–Meier survival curves, enabling retrospective analyses and digital trial simulation.
- Built an internal R/Shiny application to automate the extraction and back-engineering of survival data from Kaplan–Meier plots.
- Created a tool for extracting baseline characteristics of patients from internal study reports to support comparative effectiveness analysis.
- Implemented Matching-Adjusted Indirect Comparison (MAIC) techniques to compare Novartis clinical trial data with external study populations, enhancing decision support in regulatory and health technology assessment contexts.

Student Assistant and Internships

Various Institutions

Aug 2014 – Oct 2019 | Göttingen, Germany

- Student Assistant, Institute of Statistics and Econometrics (DFG GRK 1644: *Scaling Problems in Statistics*, Stochastic Frontier Analysis).
- Supported research within the DFG Graduate School 1644.
- Accounting Intern, West Cargo GmbH; Finance/Controlling Intern, NVV.

CONFERENCES ATTENDANCE

- *AI By The Bay - Reliable Agentic AI Conference, 2025, Oakland*
- *COSEAL - Configuration and Selection of Algorithms Workshop, 2025, Porto*
- *SGAI - International Conference on Artificial Intelligence, 2024, Cambridge*
- *ICML - International Conference on Machine Learning, 2024, Vienna*
- *SGAI - International Conference on Artificial Intelligence 2023, Cambridge*
- *EWRL - European Workshop on Reinforcement Learning, 2023, Brussels*

REFEREES

Dr. Bei Peng
@ University of Liverpool
bei.peng@liverpool.ac.uk

Dr. Alexei Lisitsa
@ University of Liverpool
lisitsa@liverpool.ac.uk

- R/Shiny toolkit to digitise Kaplan–Meier curves and reconstruct IPD; supported MAIC workflows for HTA.

EDUCATION

Ph.D. in Electrical, Electronic & Control Engineering

University of Liverpool

Dec 2020 – Present | Liverpool, UK

- Thesis: *Bayesian Reinforcement Learning for Control of Continuous Industrial Processes*

M.Sc. in Applied Statistics

Georg-August-Universität Göttingen

Oct 2017 – Jan 2020 | Göttingen, Germany

- Thesis: *Deep Unsupervised Data Compression on Life Insurance Client Data*

B.A. in Economics

Georg-August-Universität Göttingen

Apr 2014 – Oct 2017 | Göttingen, Germany

- Thesis: *Choice of Smoothing Parameters in Penalized Linear Models*

LANGUAGES

German
English
French

PUBLICATIONS

Journal Articles

- O. Dippel, A. Lisitsa, and B. Peng, "Heuristic transformer: Belief augmented in-context reinforcement learning," 2025.

Conference Proceedings

- O. Dippel, A. Lisitsa, and B. Peng, "Contextual transformers for goal-oriented reinforcement learning," 2024.
- O. Dippel, A. Lisitsa, and B. Peng, "Deep reinforcement learning for continuous control of material thickness," 2023.